UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,254	07/03/2001	Jennifer Quirin Trelewicz	IBMN.026US01 (0526)	1933

62626 7590 11/29/2006		EXAMINER	
DAVID W. LYNCH		THOMPSON, JAMES A	
CHAMBLISS, BAHNER & STOPHEL			
1000 TALLAN BUILDING-T		ART UNIT	PAPER NUMBER
TWO UNION SQUARE		2625	
CHATTANOOGA, TN 37402			

DATE MAILED: 11/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/898,254	TRELEWICZ ET AL.
	Examiner	Art Unit
	James A. Thompson	2625

Office Action Summary

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>06 September 2006 and 13 November 2006</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,2,5,7,8,11,13,18,21,23 and 1417</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>12 December 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>11/13/06</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1.   The information disclosure statement filed 13 November 2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Specifically, there is no copy of the reference "Postscript Screening" by Peter Fink. Furthermore, the information disclosure statement filed 13 November 2006 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. Specifically, JP 10-504151 is solely in Japanese. The Information Disclosure Statement has been placed in the application file, but the information referred to in the two aforementioned references has not been considered.

Response to Arguments

2.   Applicant's arguments, see page 9, lines 5-7, filed 06 September 2006, with respect to the rejection of claims 1, 2 and 5 under 35 USC §101 have been fully considered and are persuasive. The rejection of claims 1, 2 and 5 listed in items 2-3 of the previous office action, mailed 30 May 2006, has been withdrawn. Claims 17, 18 and 21, however, are still rejected under 35 USC §101, though for slightly different reasons than set forth in item 4 of said previous office action due to the present amendments to the claims. The rejection of presently amended claims 17, 18 and 21 under 35 USC §101 is set forth in detail below.

3.   Applicant's arguments, see page 9, lines 10-13, filed 06 September 2006, with respect to the rejection of claims 17, 18 and 21 under 35 USC §112, 2nd paragraph have been fully considered and are persuasive. The rejection of claims 17, 18 and 21 under 35 USC §112, 2nd paragraph listed in items 5-6 of said previous office action has been withdrawn.

4.   Applicant's arguments filed 06 September 2006 have been fully considered but they are not persuasive. Applicant's arguments are directed to the present amendments to the claims, and not the claims as recited immediately prior to said previous office action. As such, new grounds of rejection have been necessitated by the present amendments to the claims and are set forth in detail below.

Claim Rejections - 35 USC § 101

5.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6.   **Claims 17, 18 and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.** Claims 17, 18 and 21 recite a program storage medium readable by a computer. Thus, claims 17, 18 and 21 recite software *per se* and not a computer-readable medium encoded with a computer program which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   **Claims 1-2, 7-8, 17-18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curry (US Patent 5,537,223) in view of Allen (US Patent 6,535,307 B1).**

        Regarding claims 1, 7, 17 and 23: Curry discloses a control unit (figure 2(51) of Curry) for receiving a print file and processing the print file for printing (column 9, lines 25-31 and column 10, lines 61-65 of Curry); a print head (figure 2(76, 15) of Curry) for conveying a print job according to the print file (column 5, lines 58-67 of Curry); and a device (figure 2(70) of Curry) for generating a spot for use in halftoning wherein the halftoning reproduces an image defined by the print file using the print head (column 11, lines 13-23 of Curry), the device defines a spot function that combines two functions (the functions that comprise the function for an ellipse) selected to provide changing of the shape of a spot for use in a halftone cell (column 11, lines 54-58 of Curry) and rotates the spot function according to gray-scale level (column 28, lines 62-65 of Curry – amount of rotation possible for halftone dot of higher gray level less than level of rotation possible for halftone dot of smaller gray level if gray level is not to be affected) using a parameterized spot rotation function (figures 38-41 and column 31, lines 5-15 of Curry) that varies according to a value of a first and second spot function ordinate (figures 38-41 and column 31,

lines 13-20 of Curry) and scaled according to a shape changing scaling function (column 27, lines 43-54 of Curry) based on a gray level for the spot (column 28, lines 62-65 of Curry – amount of scaling possible for halftone dot of higher gray level less than level of scaling possible for halftone dot of smaller gray level if gray level is not to be affected), wherein the spot function used by the device is described by

$f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \alpha\cos(\pi y/p_y)\right)$, where x and y are the first and second spot function ordinates, p_x

scales ordinate x, p_y scales ordinate y (column 31, lines 13-20 of Curry), and α is a scaling value that determines the ellipticity of the spot function (column 27, lines 43-54 of Curry). The spot shape is an

ellipse, and can thus be represented by the basic function $f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \alpha\cos(\pi y/p_y)\right)$, where α

determines the relative scale of the major and minor axes of the ellipse and the values π/p_x and π/p_y determine the rotational properties of the ellipse with respect to the x and y coordinates, respectively. Changing the rotation of the ellipse (figures 38-41 and column 31, lines 5-20 of Curry) alters the values of p_x and p_y for this representation of the spot function. The value of α is determined based on the resultant shape of the ellipse, which is affected by the Gaussian spot growth that occurs as a result of the laser optics and the spot growth function for the gray level that is to be rendered (column 27, lines 43-54 of Curry).

Curry does not disclose expressly that the spot function is scaled using a parameterized spot scaling function that varies according to a value of a first and a second spot function ordinate; that the shape changing is asymmetric; and that the spot function used by the device is described by

$f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \frac{1}{S(p,r)}\cos(\pi y/p_y)\right)$ where p is a spot shape parameter for controlling the shape of

the spot, $S(p,r)$ is a scaling function, and r is the radius of the spot.

Allen discloses scaling the spot function according to a parameterized spot scaling function that varies according to a value of a first and a second spot function ordinate (setting spot size, shape and ellipticity) (column 4, lines 16-23 of Allen); and that the spot function used by the device is described by

$f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \frac{1}{S(p,r)}\cos(\pi y/p_y)\right)$, where p is a spot shape parameter for controlling the shape of

the spot, $S(p,r)$ is a scaling function, and r is the radius of the spot (spot size and edge sharpness) (column 4, lines 16-23 of Allen). By specifically controlling the spot size, shape and ellipticity, the factor α of the equation which represents the spot function of an elliptical halftone spot would be a function of ordinate position and spot radius, since the radius is directly related to the spot size and the ellipticity is

controlled based on the ordinate values. By controlling the spot size and edge sharpness of the spot function, the amount of spreading of the spot function is controlled. Since the spot is an ellipse, this would also be based on the radius and ordinates of the spot function. Thus, in the given elliptical equation, the factor a can be replaced with a value that is a function of the ordinates (which can also be represented simply by p) and the radius ($S(p,r)$). Thus, the resultant spot function can be expressed as

$f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \frac{1}{S(p,r)}\cos(\pi y/p_y) \right)$ where x and y are the first and second spot function ordinates,

p_x scales ordinate x, p_y scales ordinate y, p is a spot shape parameter for controlling the shape of the spot, $S(p,r)$ is a scaling function, and r is the radius of the spot. Furthermore, by applying said spot function which changes the shape of the spot, the shape changing scaling function is thus asymmetric.

Curry and Allen are combinable because they are from the same field of endeavor, namely digital halftone rendering and the manipulation of halftone spot functions. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to further control the scale and spreading of the elliptical spot function taught by Curry, according to the teachings of Allen. The motivation for doing so would have been that finer control over the spot function naturally results in better quality printed output. Therefore, it would have been obvious to combine Allen with Curry to obtain the invention as specified in claims 1, 7, 17 and 23.

Further regarding claim 1: The printing system of claim 7 performs the method of claim 1.

Further regarding claim 17: Curry discloses a program storage medium readable by a computer, the medium tangibly embodying one or more programs of instructions executable by the computer to perform halftoning an image (column 8, lines 49-60 and column 9, lines 29-34 of Curry). The one or more programs of instruction embodied on the program storage medium readable by a computer performs the method of claim 1.

Further regarding claim 23: The means for receiving recited in claim 23 corresponds to the control unit of claim 7. The means for conveying recited in claim 23 corresponds to the print head of claim 7. The means for generating recited in claim 23 corresponds to the device of claim 7.

Regarding claims 2, 8 and 18: The spot function set forth in claims 1, 7, 17 and 23 is defined by two functions ($\cos(\pi x/p_x)$ and $\frac{1}{S(p,r)}\cos(\pi y/p_y)$). The overall function of the elliptical spot is fully

expressed as $f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \frac{1}{S(p,r)}\cos(\pi y/p_y) \right)$, as set forth above, where x and y are the first and

second spot function ordinates, p_x scales ordinate x, p_y scales ordinate y, p is a spot shape parameter

for controlling the shape of the spot, $S(p,r)$ is a scaling function, and r is the radius of the spot. Non-separable changes in spot shape is an inherent property of the two functions since the two functions form the elliptical spot function so that $f(x,y) = \frac{1}{2}\left(\cos(\pi x/p_x) + \frac{1}{S(p,r)}\cos(\pi y/p_y) \right)$.

9.   **Claims 5, 11 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curry (US Patent 5,537,223) in view of Allen (US Patent 6,535,307 B1) as applied to claims 1, 7 and 17 above, and further in view of obvious engineering design choice.**

Regarding claims 5, 11 and 21: Curry discloses a Gaussian spot growth that occurs as a result of the laser optics and the spot growth function for the gray level that is to be rendered (column 27, lines 43-54 of Curry). As is well-known in the art, a Gaussian distribution takes the form of

$$P(x) = \frac{1}{\sigma_1\sqrt{2\pi}}\exp\left(\frac{-(x-\mu)^2}{2\sigma_2^2} \right).$$

Allen discloses scaling the spot function (spot size and edge sharpness) using the scaling function $S(p,r)$, where p is a spot shape parameter for controlling the shape of the spot and r is the radius of the spot (column 4, lines 16-23 of Allen).

Curry in view of Allen does not disclose that $S(p,r) = 1 + \frac{1}{p_m\sqrt{2\pi}}\exp\left(\frac{-(r/\sqrt{2} - 1/2)^2}{2p^2} \right)$, where p_m sets a maximum ellipticity of the spot. However, it would have been an obvious engineering design choice to set the parameters of the Gaussian distribution taught by Curry such that the spot function is specifically $S(p,r) = 1 + \frac{1}{p_m\sqrt{2\pi}}\exp\left(\frac{-(r/\sqrt{2} - 1/2)^2}{2p^2} \right)$. In this equation, p_m sets a maximum ellipticity of the spot, which is an inherent property of p_m. The motivation one of ordinary skill in the art at the time of the invention would have had to set the spot function in such a manner would be that (1) the offset of +1 would set a specific rotation to the ellipse, such as that shown in figures 38-41 of Curry, and (2) a Gaussian distribution such as denoted by the $\frac{1}{p_m\sqrt{2\pi}}\exp\left(\frac{-(r/\sqrt{2} - 1/2)^2}{2p^2} \right)$ part of the equation is one of the many options for a spot function that can be employed based on the requirements of the printing and the particular characteristics of the laser diodes used in print head. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify in the above way the invention as specifically set forth by Curry in view of Allen, thus obtaining the invention as specified in claims 5, 11 and 21.

10.   **Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Curry (US Patent 5,537,223) in view of Allen (US Patent 6,535,307 B1) and Vaswani (US Patent 5,835,097).**

    Regarding claim 13: Curry in view of Allen does not disclose expressly that the device is a hardware card disposed between the control unit and the print head.

    Vaswani discloses a hardware card for graphics processing (figure 3A(310) of Vaswani) disposed between a control unit (figure 3A(301-304) of Vaswani) and an image output device (figure 3A(305) of Vaswani) (column 6, lines 53-60 of Vaswani).

    Curry in view of Allen is combinable with Vaswani because they are from similar problem solving areas, namely the construction of an electronic device that performs digital image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody said device taught by Curry in view of Allen as a hardware card disposed between a control unit and an image output device, as taught by Vaswani, said control unit being the control unit taught by Curry in view of Allen and said image output device being the print head taught by Curry in view of Allen. The motivation for doing so would have been that, as is well-known in the art, a separate hardware card for graphical processing decreases the computational burden on the main computer processor. Therefore, it would have been obvious to combine Vaswani with Curry in view of Allen to obtain the invention as specified in claim 13.

11.   **Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Curry (US Patent 5,537,223) in view of Allen (US Patent 6,535,307 B1) and Cunniff (US Patent 5,842,015).**

    Regarding claim 14: Curry in view of Allen does not disclose expressly that the device is a hardware card disposed within the control unit.

    Cunniff discloses a graphics hardware card (figure 1(16) of Cunniff) disposed within a control unit (figure 1(18) of Cunniff) (column 5, lines 52-57 of Cunniff).
Curry in view of Allen is combinable with Cunniff because they are from similar problem solving areas, namely the construction of an electronic device that performs digital image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to embody said device taught by Curry in view of Allen as a hardware card disposed within the control unit. The motivation for doing so would have been that a separate hardware card for graphical processing decreases the computational burden on the main computer processor (column 1, lines 21-26 of Cunniff). Therefore, it would have been obvious to combine Cunniff with Curry in view of Allen to obtain the invention as specified in claim 14.

Conclusion

12.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

    A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

    Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.
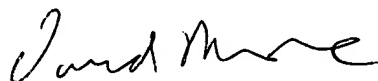
    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

    Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

James A. Thompson
Examiner
Technology Division 2625

22 November 2006

DAVID MOORE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600